DEPARTMENT OF THE NAVY
OFFICE OF THE CHIEF OF NAVAL OPERATIONS
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WASHINGTON, DC 20350-2000

OPNAVINST 5200.35
N81
26 Oct 06

OPNAV INSTRUCTION 5200.35

From: Chief of Naval Operations

Subj: OPNAV PERFORMANCE/PRICING MODELS POLICY AND PROCEDURES

Ref: (a) The President's Management Agenda (PMA), Fiscal Year 2002
(b) SECNAV Memorandum, FY-05 Resource Management Process of 26 November 2002
(c) DoD 7000.14-R, Department of Defense Financial Management Regulations
(d) SECNAVINST 5200.38A
(e) SECNAVINST 5000.36A

Encl: (1) Definition of Terms
(2) Performance/Pricing Model Policy
(3) Template for Requesting Performance/Pricing Model Exemption
(4) Performance/Pricing Models Verification & Validation (V&V) Template
(5) Standard Procedures for Routing Model Accreditation Packages
(6) Accreditation Levels for Performance/Pricing Models
(7) Re-Accreditation of Performance/Pricing Models
(8) Model Pricing Validation Team (MPVT) Process for POM/PR Development
(9) Performance/Pricing Model Process Responsibilities

1. Purpose. To establish policy and requirements for development, accreditation, and use of performance/pricing models in the Planning, Programming, Budgeting and Execution (PPBE) process.

2. Background

a. References (a) and (b) establish the policy for federal government to focus federal programs on performance and establish performance measures that are properly integrated into budget submissions and agency management and operation.

Additionally, through creative collaboration, simplifying our practices and use modern models that link performance with resources.

b. Navy Resource Sponsors (RS) and Budget Submitting Offices (BSOs) have used OPNAV N8 accredited models to develop budget submissions and program proposals since Fiscal Year (FY) 2004. Prior to FY-04, some Navy PPBE stakeholders used detailed but unaccredited models to develop Program Objectives Memorandum/Program Review (POM/PR) input while others relied on budgetary level-of-effort projections for this purpose.

c. The Navy's performance/pricing models have predominantly – though not exclusively – focused on readiness, operations, and maintenance accounts. Models are currently being used to support resource sponsor programming decisions for approximately two-thirds of the Operation and Maintenance, Navy (OMN) appropriation, along with smaller proportions of other appropriations.

3. Policy. This instruction incorporates guidance from earlier, but now expired Navy programming serials and provides policy to support the objective of improving the Navy's ability to relate resource levels to specific performance outputs. Enclosure (2) contains details on the policy areas listed below. Organizations using performance/pricing models should review its contents.

a. Applicability. Unless the applicable resource sponsor receives an exemption from OPNAV N8, all Navy resources in operating (i.e. non-investment) appropriations of $50 million or more should be justified using accredited models where practicable. Enclosure (3) should be used to request an exemption.

(1) Non-modeled programs are strongly discouraged since they are vulnerable to resource allocation decisions that lack insight into risk.

(2) Models owned or sponsored by the Office of the Secretary of Defense (OSD) are exempt from the accreditation process discussed in this instruction.

b. Role in PPBE Process

(1) Resource sponsors should identify models used in developing POM/PR development briefings.

(2) Programs as defined in enclosure (1) with annual resources of at least $50M that are not supported by accredited models shall be identified as level-of-effort in the POM/PR development briefings.

c. Models Use and Budget Development. Models should provide information and data directly linked to budget development and useful in the budget formulation process described in reference (c), including preparation of budget exhibits.

d. Performance Levels. Performance level definitions should substantively address the consequences of funding a program at one level versus another and should provide meaningful information to resource sponsors, programmers, BSOs, and Office of Budget/Fiscal Management Division (FMB).

(1) Each performance level description must include a clear summary of the output associated with funding to the model-generated resource level.

(2) Failure to demonstrate the ability to provide a minimum of four clearly defined performance levels will preclude OPNAV accreditation.

e. Accuracy. Model managers shall annually demonstrate the accuracy of each model’s predictive ability, as well as the currency and validity of the cost factors used by the model. This can be done directly to OPNAV N8 accreditation reviewing team and/or during the Model Pricing Validation Team (MPVT) briefing process.

f. Model Validity. Model managers must ensure they are using traceable inputs before entering information into their model. When exercising the model, attention should be paid to outputs that are significantly different from anticipated levels. These exceptions should be investigated to identify cause, and determine corrective measures in model design and/or computation.

g. Model Accessibility. Model managers will ensure that OPNAV resource allocation decision makers have access to models such that OPNAV programmers and budgeters can conduct

independent evaluations of model-generated resource requirements. This requirement should be considered when identifying the model's user community and in developing the model's user's guide.

h. Accreditation Process. Enclosure (4) contains an example of the template to be used by model managers to submit a Verification and Validation (V&V) Report to OPNAV N8 for accreditation. Enclosure (5) outlines the accreditation process. Enclosure (6) describes the accreditation levels a model may earn. Finally, enclosure (7) outlines the process and criteria for both follow-on and re-accreditation of models.

i. Model Pricing Validation Team (MPVT). The MPVT process will evaluate assumptions, pricing and pricing methodologies contained in models used in POM/PR development. Enclosure (8) contains details about the MPVT process.

j. Configuration Control. OPNAV N8 will maintain the master version of all accredited models, unless the model manager demonstrates why this is impractical. In the latter case, model managers shall provide access to OPNAV stakeholders for independent excursions that require model output.

k. Software Standardization. To comply with Department of Defense (DoD) and Department of the Navy (DON) objectives for reducing the number of Information Technology (IT) applications, model managers shall ensure that standard Navy software is used in developing models that will be used for making resource allocation decisions or recommendations. Model managers shall ensure that Functional Area Managers - described in reference (d) - approve of software to be used for developing models.

l. Model Registration. Model managers will ensure that accredited models are registered with both the Navy's Modeling and Simulation Resource Registry (MSRR) found on the Navy Modeling and Simulation Management Office web sites

(http://nmso.navy.mil) in accordance with reference (d) and in the DN Application and Database Management System (DADMS) found on the DADMS website (https://www.dadms.navy.mil), in accordance with reference (e).

m. Status of Existing Models. Models accredited under prior years' serialized guidance are "grandfathered" to the extent that they satisfy the revised accreditation level definitions contained in enclosure (6). OPNAV N8 will review

the current status of all models. All accredited models that cannot demonstrate direct linkage to budget development and usefulness in the budget formulation process will be granted "Partial Accreditation", as defined in enclosure (6). Model managers are expected to complete improvement plans to achieve Full Accreditation.

4. Responsibilities. Resource sponsors, BSOs, and model managers should review enclosure (9) for specific responsibilities in supporting the Navy's Performance/Pricing model process.

5. Updates. OPNAV N81 shall review this instruction annually and provide recommendations for revision as necessary.

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DEFINITIONS OF TERMS

1. Accreditation: The independent determination that a model or simulation is acceptable to use for a specific purpose, for instance to make planning, programming, and/or budgeting decisions (or recommendations). In other words, “Should we use the model?”

2. Budget Quality Output: Describes model output that is in the format and detail outlined in the Department of Defense Financial Management Regulations (DoD 7000.14-R). This data is suitable for use by N82/FMB in making resource allocation recommendations.

3. Level-of-Effort (LOE): A process by which a program, or collection of programs, develops resource requirements based largely on historical PPBE data, adjusted for changes in rates, inflation, or other factors. Generally, LOE-derived resource requests provide very little insight for making risk-based resource allocation decisions.

4. Non-Modeled Program: Programs with annual resources > $50M that have not completed accreditation as discussed in this instruction. While some of these programs may use legacy models – and hence are not strictly LOE programs – lack of accreditation hinders corporate use of the model throughout the PPBE process and is thus discouraged.

5. Performance Levels: Objective and quantifiable model characteristics which are defined and agreed upon by model stakeholders and reflect the model manager’s assessment regarding the purpose of, requirements for, and risk-bearing capacity of their program. Performance levels should help identify risk-based fiscal trade space.

6. Performance/Pricing Models: Analytical tools used to relate costs to performance levels for a given Navy program, or collection of programs. These models should enhance the ability of Navy corporate leadership to make risk-informed resource allocation decisions. Performance/Pricing models should be used to determine resource requirements, based on OPNAV accredited output metrics and performance goals.

7. Program: A grouping of resources associated with mission(s) for which a responsible Navy entity has management or executive responsibilities. Examples include Flying Hour Program, Ship Operations, Base Operating Support, and countless others. Programs may be described by budget line item, program element, appropriation, or any combination. Program descriptions shall be explicit in identifying the fiscal scope and the qualitative responsibility of the program managing organization, with respect to the specific program.

8. Verification: The process of determining that a model or simulation accurately represents the developer's conceptual description and specifications. In other words, "Was the model built correctly?"

9. Validation: The process of determining the degree to which a model or simulation is an accurate representation of the real world, from the perspective of the intended users. In other words, "Was the right model built?"

10. Operating Appropriations: Includes OMN, OMNR, MPN, RPN, FHN(OPS), ERN and the operations & maintenance portions of NDSF.

Note: Unless otherwise described, the word "model" should be understood to mean "performance/pricing model" throughout this instruction.

PERFORMANCE/PRICING MODEL POLICY

1. General. The OPNAV Performance/Pricing Model process is established by this instruction. Models help resource allocation decision makers make risk-informed judgments by linking performance to pricing. As such, non-modeled programs are strongly discouraged because they are vulnerable to uninformed resource allocation decisions. Every model used within the scope of this instruction, whether embedded in a larger model, implemented as a stand-alone system or integrated with other models shall be verified, validated and accredited as set forth in this instruction.

2. Models used in the PPBE Process. Models are to be used throughout the PPBE process in order to provide greater clarity, confidence in how budget requirements are derived and to assist leadership with determining budgetary decisions and there impact. They will also be used to aide in identifying trade space for savings as necessary. The following are guidelines for models use in the PPBE process.

a. During the Planning phase, program managers and BSOs should use models to understand their resource requirements.

b. During the Programming phase, models are to be used by OPNAV, Sponsors, and BSOs to assist in the development of POM/PR recommendations and decisions.

c. OPNAV should also incorporate the use of models during the Budgeting phase to provide FMB and Congress necessary reports as part of the president’s budget.

d. In the Execution phase the actual resource consumption for programs can be and should be used in model feedback loops as both a check to ensure accuracy and to provide a means for improving models.

e. Model managers and resources sponsors in order to provide the optimum use in supporting PPBE decisions, are strongly encouraged to provide model output in the form of budget justification materials for use in POM/PR and budget development and formulation.

f. POM/PR development briefings shall identify models used for making resource allocation decisions or recommendations. This requirement applies to accredited, non-accredited and OSD models used in POM/PR development.

3. Modeling Applicability. All Navy operating (i.e., non-investment) appropriations will be supported by accredited models, unless the affected resource sponsor receives an exemption from OPNAV N8 *or it is not feasible to do so*. Investment appropriations are strongly encouraged to develop analytically rigorous methods for determining annual requirements; these methods should be identified in PPBE process briefings.

4. Integrated Models. OPNAV is committed to developing resource allocation tools that result from the integration of multiple accredited models. While such models do exist – e.g., Flying Hours Program Model and Ordnance Program Optimization Model – sponsors are encouraged to pursue wider application and continuous improvement of integrated models in POM/PR development.

5. Minimum Size for Accreditation. Programs with less than $50M annual resource requirements are not required to complete the accreditation process outlined in this instruction.

6. Exemptions and Exemption Requests. OSD developed models are exempt from the accreditation process discussed in this instruction. Note: A Navy model that uses an OSD model output as a key driver is not exempt from the guidelines in this instruction, unless OPNAV N8 approves an exemption request. Sponsors or claimants can request exemption from the modeling process. Such requests are submitted to OPNAV N8 for approval/disapproval, via OPNAV N81, using command letterhead. Enclosure (3) is provided for use in developing a specific exemption request. Resource sponsors, BSOs, FMB, and OPNAV N81 will be copied on all approved (or disapproved) exemption requests.

7. Performance Levels. Performance level definitions should substantively address the consequences of funding a program at one level versus another and should provide meaningful information to resource sponsors, programmers (OPNAV N80), BSOs and FMB.

a. The definitions must include both qualitative *(e.g., what does this do to the program's ability to satisfy its requirements?)* and quantitative *(e.g., how much fiscal trade space is available by accepting a given performance level?)* elements.

b. Failure to demonstrate the ability to provide a minimum of four clearly defined performance levels will preclude OPNAV accreditation.

8. Model Validity. Model managers must ensure they are using traceable inputs before entering information into their model. They must also remain alert to outputs that significantly exceed anticipated levels. Model managers shall ensure that a mechanism or process is demonstrated to the OPNAV N8 Accreditation team that shows:

a. The relevant range of operation for the model, as defined by the model manager. This is comprised of both qualitative and quantitative definitions and includes the range of expected program.

b. How the model identifies circumstances – and what actions are thereby triggered – when model assumptions are violated or when model output significantly exceeds anticipated levels. The output may be valid, but it may also be due to erroneous input data or assumptions. In other words, the model manager must demonstrate the capability of validating all model inputs and recommendations.

c. How the model's feedback loop can effectively use execution data as part of its feedback loop for ensuring model accuracy and for improving the capability of the model. Model managers shall annually demonstrate the accuracy of the model in predicted requirements versus actual resource consumption. This demonstration should be included as part of the annual Model Pricing Validation Team (MPVT) briefings (see item 16).

9. Accreditation Process. Modeled programs shall complete accreditation using a Verification and Validation (V&V) Report template provided by OPNAV N8. Enclosure (4) contains an example of this template, though model managers should contact OPNAV N81 to ensure they are using the most current template.

10. Accreditation Levels. Enclosure (6) provides definitions for the levels of accreditation along with a matrix that describes the linkage between accreditation levels and the model's usefulness in the PPBE process.

a. The accreditation team will use enclosure (4) in making an accreditation recommendation to OPNAV N8.

11. Re-Accreditation. Models will undergo re-accreditation as discussed in enclosure (7), using enclosure (4), or its most current revision.

12. Configuration Control & Management. Model Managers shall ensure the following:

a. A master version of accredited models is submitted to OPNAV N8. If this is logistically or fiscally impracticable, model managers will discuss in the V&V Report specific configuration control processes that will prevent improper use of the model in developing resource requirements.

b. Changes to the model shall be documented per the Configuration Management Plan and Model Management section of the model's accredited V&V Report.

13. Model Pricing Validation Team (MPVT). The MPVT process will evaluate assumptions, pricing and pricing methodologies contained in models used in POM/PR development. Enclosure (8) contains details of the MPVT process.

14. Status of Existing Models. The accreditation levels for existing models – i.e., those pre-dating this instruction – are defined in reference (c). Since this instruction outlines a more rigorous standard for performance/pricing models, earlier accreditation results are "grandfathered" only to the extent that they satisfy the revised accreditation level definitions contained in enclosure (6).

a. OPNAV N8 will review the current status of all models, and unless capable of providing budget quality output as defined in enclosure (1), all accredited models will be granted "Partial Accreditation".

b. Model managers are expected to complete improvement plans to achieve Full Accreditation.

TEMPLATE FOR REQUESTING PERFORMANCE/PRICING MODEL EXEMPTION

1. Background. This template is provided for use in providing a formal request for resources to be exempted from the OPNAV requirement to develop performance models. The spreadsheets and executive summary discussed below should be accompanied by a cover letter that is endorsed by the applicable program's resource sponsor(s). The exemption request package will be submitted to OPNAV N8, via OPNAV N81, no later than January of the calendar year. Once exempted from the modeling process, programs are not required to resubmit requests except as solicited by OPNAV N8.

2. Basis for Exemption. OPNAV N8 will consider exemption requests on a limited, case-by-case basis. Circumstances where exemption might be considered includes high cost of model development and/or sustainment, difficulty of separating modeled resources from other resources within model manager's or sponsor's responsibility, low level of resources in relevant model, and impossibility of quantitatively defining performance levels. Other rationales may also be tendered by sponsors requesting exemption from the model process. Regardless of the basis for requesting exemption, the sponsor must clearly explain why the resources should not be modeled, acknowledging that failure to model results in the effected resources remaining level-of-effort.

3. Level of Effort (LOE) Program Financial Description. Each BSO will provide an Excel spreadsheet for programs intended to be exempt from the performance modeling requirement outlined by this instruction. These spreadsheets should address annual funding. Each spreadsheet should cover the FYDP defined by the relevant budget cycle. Annual funding should reflect those approved in the most recent BES submission to OSD. The structure of the spreadsheet is set forth in the table below.

Column	Column Title	Example
A	2-Digit BSO Code	19, 60, 22
B	Appropriation Short Title	OMN, OMNR, OPN, etc
C	BSO Organization Name	NAVAIR, LANTFLT, BUPERS
D	Budget Line Item (BLI)	OMN/OMNR = AGSAG APN/OPN/WPN = LI RDTEN = PE
E	RDTEN Project # or O&MN SI Code	As applicable
F	Program Element #	0204311N
G	Program Name	Air-Launched Missile Rework
H	Activity Name (optional)	AMRAAM, SIDEWINDER
I	Model Manager Code	N41, PMS 495, etc
J thru Q	Annual budget level (TY$-K), for the FYDP, including prior year, current FY, and FYDP year	

4. Program Description. BSOs (or Sponsors) will provide a 1-page executive summary to OPNAV N81 that includes a description of each LOE program for which exempt status is being requested. This summary will be an attachment to the cover letter referred to in enclosure and will describe:

- How the program manager determines requirements
- Major program components
- Data sources (and how they have been validated)
- How the program manager prices requirements
- An explanation of why the program should not be modeled
- An explanation of the risks of under-funding the program

Performance/Pricing Models
Verification & Validation (V&V) Template

Version 2.0, February 2004

OVERVIEW

This template will be completed for all models and submitted to the Performance/ Pricing Model Accreditation authority (OPNAV N8). Attach all documentation that supports your Verification and Validation (V&V) effort. More details can be found in SECNAVINST 5200.40, VV&A of Models and Simulations.

In the context of programming and budgeting, the purpose of conducting a VV&A is to establish confidence or trust in the model or methodology being used to generate requirements. The V&V Template is a tool to collect the evidence necessary to establish the credibility of the model for its specified use.

Date of completion for this report: _____
Responsible author: _____
Author's organization: _____

Model Identification

Model name: _____

[Note: This name is automatically placed in each page footer when the document is printed.]

Version or release: _____

Responsible verification agent: _____
Agent's organization: _____
(Identification of the individual responsible for managing the verification effort and compiling the results)

Responsible validation agent: _____
Agent's organization: _____
(Identification of the individual responsible for managing the validation effort and compiling the results)

Performance/Pricing Models
Verification & Validation (V&V) Template

Version 2.0, February 2004

V&V Team Information (name, organization, phone and email):

- Proponents/owners:
- Users:
- Independent agent (if applicable):

Name	Organization	Phone	Fax	E-mail

Performance/Pricing Models Verification & Validation (V&V) Template

Version 2.0, February 2004

Model Description and Background

Fully understanding the Modeling and Simulation (M&S) development requirements is essential for the VV&A effort. These requirements define the functionality and capability, which the user requires of the model or simulation system. They also serve as the foundation against which the simulation will be verified and validated.

Please identify the acronyms used in describing the model anywhere within this completed template.

ACRONYM	EXPLANATION

Briefly describe the model or simulation and the program(s) the model supports.

Is this a new model, legacy model (detail the extent of the VV&A actually performed, or indicate "model used for x years with little or partial VV&A"), a model still under development, or a change to an existing model?

What is the history behind development of the model?

Summarize aspects of past V&V and/or past M&S that may impact accreditation. Provide a copy of any VV&A documentation. If the model has been formally accredited or otherwise formally approved for a specific application or set of applications, provide the documentation demonstrating formal accreditation or approval.

Performance/Pricing Models
Verification & Validation (V&V) Template

Version 2.0, February 2004

Who uses the model? Is the model designed and developed for the level of competency of the user for its intended purpose? Are there supporting documents such as user's manual, technical manual, and/or reference guide? Please either attach copies to this template or provide references.

Describe the model's linkage back to approved CNO goals. Typical references include sections of documents such as: Strategic Planning Guidance, Fleet Manning Documents, DoD Instructions, etc. If CNO goals have not yet been established, state so and provide any plans in place to create them.

Define the model's performance levels, components of the performance levels, and describe how they were developed. Demonstrate how the model is linked to readiness or other performance metrics. Ideally, performance models should have at least four performance level options. If your model does not have at least four performance levels as a result of an issue specific to your program, see your N81 Model Representative before continuing with this V&V.

Additional comments:

Model name: _____

Performance/Pricing Models
Verification & Validation (V&V) Template

Version 2.0, February 2004

Conceptual Validation

The conceptual model serves as a bridge between the defined requirements and the M&S design, providing the developer's interpretation of the requirements to which the model or simulation will be built. The conceptual model is a statement of assumptions, algorithms, and architecture that relates the elements of the model to one another for the intended applications of the models or simulations.

Was a conceptual model developed prior to developing your model? Provide a graphic representation of the model with a written description explaining the process.

Drivers: List and describe the model drivers. Examples of model drivers include -- but are not limited to -- assumptions, OSD/USN/USMC policies and guidance, and output from other models.

a. Identify the key drivers below and describe why they are significant. Complete a Key Drivers V&V page for these key drivers (attached at the end).

b. Are the assumptions, policies, or guidance represented by input variables or are they fixed? Who determines whether to accept or changes these drivers?

c. If output from other models is used, provide VV&A or other documentation that validates the use of this input.

Components: What budget categories do you consider to be separate model components? Model components represent categories and sub-categories for which separate cost estimates are produced. Examples of model components include: Personnel

(direct and indirect), projects/contracts, materials, equipment, maintenance, etc. If a POA&M has been generated addressing the future modeling of components, please attach a copy to this template. a. List and describe the model components. Include a short name for each component and use the short name in column one of the table in paragraph (2) below:

-
-
-
-

b. Provide your program's total obligation authority in tabular format (see example table below).

In the first column list the model components and any associated subcomponents. List all subcomponents as a separate row entry.

- **In the second column, list the dollar amount allocated to each respective component and subcomponent.**
- **In the third column list the percentage of the component that is explicitly modeled (in terms of the portion of the total dollar amount attributed to that component). For example, if the personnel component of a program is allocated $100 million (see Component 1in table below) and $20 million of that amount is modeled using a cost estimation model with the remaining $80 million estimate based on a level of effort approach, then the column three entry would be 20%.**

Model name: _____

Performance/Pricing Models Verification & Validation (V&V) Template

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- **In the fourth column briefly characterize the modeling approach, or lack thereof, used for the component. If a component is not modeled, explain the reason and any steps in place to model those components. Include supplementary notes for clarifications or amplifying information if needed.**

Component (short name)	Total Cost Estimate	Percentage of the Component modeled	Modeling Method
Component 1	$100M	20%	Cost estimating relationships
Component 2	$240M	75%	(as below)
Subcomponent 2.1	($120M)	50%	Price History/Analogy
Subcomponent 2.2	($120M)	100%	Engineering Estimate
Component 3	$ 60M	0%	Not modeled – Level of Effort
TOTALS	$400M	50% - weighted average of Total Cost Estimate	

Model name: _____

Component (short name)	Total Cost Estimate	Percentage of the Component modeled	Modeling Method

Performance/Pricing Models Verification & Validation (V&V) Template

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Component (short name)	Total Cost Estimate	Percentage of the Component modeled	Modeling Method
TOTALS			

Outputs: What does the model actually produce?

a. List and describe the model outputs:

b. Demonstrate how the model outputs provide information relevant to resource allocations. Does the model have the ability to determine the requirement and price beyond the programmatic level down to the claimant/activity level?

Have metrics been developed to benchmark performance and pricing against industry standards or other accepted standards?

Describe any additional steps taken (not included in the above) to validate the conceptual model.

Model name: _____

Outcome (only required for models currently under development):
Describe corrective actions planned if results not satisfactory, leading to a repeat of this validation for a later model version; or, indicate a determination that results are satisfactory; or, document any modeling workarounds planned that

will avoid or minimize impacts from unsatisfactory results at this stage and will allow the work to proceed.

Additional Comments:

Design Verification

The M&S functional design is verified against the conceptual model to ensure that it accurately reflects the validated concept and associated requirements.

Performance/Pricing Models
Verification & Validation (V&V) Template

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Was design verification done during the model development process? Provide a graphical representation of the model's design with a description. Identify the source of the diagram (e.g., derived from original source material, developed as part of the V&V process, etc.).

Demonstrate how the design meets the purpose/objectives/requirements developed in the conceptual phase.

Describe any additional steps taken (not included in the above) to verify the model's design.

Outcome (only required for models currently under development).
Describe corrective actions planned if results not satisfactory, leading to a repeat of this validation for a later model version; or, indicate a determination that results are satisfactory; or, document any modeling workarounds planned that will avoid or minimize impacts from unsatisfactory results at this stage and will allow the work to proceed.

Extent of Previous V&V:
If a V&V process has been performed, detail the scope of the V&V performed to date. This includes the portion or percentage of the model, which has been reviewed or examined as part of the formal V&V process. The following list illustrates examples of ways to itemize the scope of a typical V&V process:

Performance/Pricing Models
Verification & Validation (V&V) Template
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____% of code reviewed/subjected to static test methods, etc.
____% of models/functions/etc. demonstrated to perform as expected.
____% of boundary condition inputs examined
____% of input range examined in results validation
____% of inputs for which credible/authoritative data sources were identified

Additional Comments:

Model name: _____

System Verification

System verification is the formal (i.e., documented) test/review process by the M&S proponent responsible for determining that the M&S accurately represents the functional design and has

traceability to the conceptual model and the system requirements.

Model Design: Explain the model's design.

a. Provide a high-level diagram of the model as used, depicting inputs, outputs, process elements, performance feedback loop(s), and cost feedback loop(s).

b. Describe the process of how the model works, referring to the diagram produced above. Ensure program-specific terms and acronyms used are included in the glossary in part 2 above. Provide in the discussion any important assumptions and key algorithms used by the model. Ensure the following elements are addressed in the description: (1) How are performance and pricing determined during the programming phase and how do these two elements of the model interact?

(2) How does actual execution data, both pricing and performance, feed back into the model? How is the model changed to reflect this data?

(3) Demonstrate how the model is linked to readiness or other performance metrics.

Model name: _____

(4) Where and how are the results of the model incorporated into the Program/Budget Information System (PBIS)?

(5) What policies influence or constrain the model's design?

(6) How are the various model processes depicted in the design diagram implemented in the working model? (i.e.,

electronic spreadsheets, web-based data entry and collection, manual data calls, Java code, .net architecture)

(7) Is the output artificially constrained by budget/financial considerations?

What test procedure is used to demonstrate model compliance to requirements? Provide documentation/test results.

How susceptible is the output to fluctuations across models/tools within and outside the system?

Describe any additional steps taken (not included in the above) to validate the conceptual model.

Outcome.

Describe corrective actions planned if results not satisfactory, leading to a repeat of this validation for a later model version; or, indicate a determination that results are satisfactory; or, document any modeling workarounds planned that will avoid or minimize impacts from unsatisfactory results at this stage and will allow the work to proceed.

Additional Comments:

Performance/Pricing Models
Verification & Validation (V&V) Template

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Results Validation

Results validation by the M&S proponent/owner is the formal (i.e., documented) test/review process that compares the responses of the M&S with known or expected behavior from the subject it represents, in order to ascertain that the M&S responses are sufficiently accurate for intended uses. This step can only be completed if real world data is available. For instance, if you have a model that was used for the first time in PR05, real world data will not be available until

execution data is available at the end of FY05. Full accreditation requires that Results Validation is complete.

Provide documentation comparing the model's actual results to the expected results.

What errors were found and how were they corrected?

Describe any additional steps taken (not included in the above) to validate the conceptual model.

Summarize conclusions reached. Describe corrective actions planned if results not satisfactory, leading to a repeat of this validation for a later model version; or, indicate a determination that results are satisfactory; or, document any modeling workarounds planned that will avoid or minimize impacts from unsatisfactory results at this stage and will allow the work to proceed.

Model name: _____

NOTE: If this step cannot be completed because real-world data is not available, describe the actions that will be taken to complete. What actions will be taken to incorporate any changes between System and Results validation (fund migration, unexpected events during execution, changes in performance goals, etc.)?

External Feedback (for ongoing validation): Demonstrate how the Navy's accounting system does/does not allow for the ability to track amount programmed vs. amount budgeted vs. amount executed for your model. What changes are required to the

accounting system if it does not support your model from programming through execution?

Subject Matter Expert (SME) Involvement: If SME assessments were substantially used as the basis for model or data correctness or acceptability, identify the SME(s) and document their credentials below.

Additional Comments:

Configuration Management Plan and Model Management

System Configuration Management is the process through which model upgrades, changes, and maintenance are recorded, communicated and controlled. A written Configuration Management Plan is required for full accreditation.

Is there a written Configuration Management Plan that addresses the following questions?
If so, please attach; if not, when will the written plan be complete?

Describe the process for suggesting, adjudicating, and prioritizing changes to the model. Discuss the methodologies to ensure changes are documented, tracked and version control is observed?

a. Who approves changes to the model?

b. Is there a method to report status of these changes to those who have an interest?

c. Are there requirements management to ensure improvements and modifications are made according to the priority of the requirements?

d. What resources exist for life cycle support of the model? Have resources been identified and allocated?

How will the model's output be subject to periodic reviews and evaluation?

List and describe and additional Configuration Management or Model Management elements.

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Accreditation Report Evaluation Summary

The information provided in the preceding sections forms the basis for the accreditation recommendation. This section lists the evaluation categories and evaluation criteria against which the model will be rated. As such, this section provides an opportunity to include amplifying information, not previously captured, which may affect the ratings assigned.

Performance Goals

Criteria	Rating Scale
For each program, modeled components are linked to CNO Performance Goals.	GREEN: Linked to CNO goals
	YELLOW: CNO goals not yet established

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	RED: Not linked to CNO goals

Provide below any information not previously provided that may affect the accreditation rating assigned for performance goals.

Performance Levels

Criteria	Rating Scale
For each program, the model produces costs for at least four performance levels.	**GREEN: Model has four or more performance levels**
	YELLOW: Model has 2 or 3 performance levels
	RED: Model produces only the full cost

Provide below any information not previously provided that may affect the accreditation rating assigned for the model's performance levels.

Key Drivers

Criteria	Rating Scale
For each program, key drivers (data, assumptions, and guidance) are credible and subject to review and revision.	**GREEN: All data is valid or certified**
	YELLOW: Most data traceable to certified source; data reviewed
	RED: Key drivers are arbitrary or best guess, data not reviewed

Provide below any information not previously provided that may affect the accreditation rating assigned for the model's key drivers.

Components

Criteria	Rating Scale
For each program, as practicable, all components	**GREEN: As practicable, all components are modeled**

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are modeled.	**YELLOW: As practicable, a POA&M is in place to model all LOE components**
	RED: No plan exists to ensure all LOE functions are modeled

Provide below any information not previously provided that may affect the accreditation rating assigned for the model components.

Design

Criteria	Rating Scale
For each program, the model's design (framework, algorithms, data sources and assumptions) accurately reflects the validated concept to produce credible results.	**GREEN: The model's design is sound and produces credible results**
	YELLOW: The model's design requires some improvements to improve results credibility
	RED: The model's flawed design produces results that are not credible

Provide below any information not previously provided that may affect the accreditation rating assigned for the model's design.

Configuration Management

Criteria	Rating Scale

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For each program, modeled components are supported by a sound written Configuration Management (CM) Plan.	**GREEN: CM process for all changes**
	YELLOW: Some CM processes for all major upgrades/code changes
	RED: No formal CM process

Provide below any information not previously provided that may affect the accreditation rating assigned for the model's configuration management.

Model name: _____

Feedback Loop

Criteria	**Rating Scale**
For each program, a sound feedback mechanism exists to allow for validating the model's accuracy.	**GREEN: Comprehensive feedback mechanism in place**
	YELLOW: Partial feedback mechanisms in place
	RED: No feedback mechanism in place

Provide below any information not previously provided that may affect the accreditation rating assigned for the model's feedback loop.

User Community

Criteria	**Rating Scale**
For each program, the model is designed and developed for the level of competency for	**GREEN: User community has the ability and tools to fully utilize the model**

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its intended purpose. The model is supported by documents such as user's manual, technical manual, and/or reference guide.	**YELLOW: User community has some of the tools and knowledge to use the model**
	RED: User community lacks adequate tools and knowledge to use the model

Provide below any information not previously provided that may affect the accreditation rating assigned for user community.

Supplemental Information: Attach other supporting documentation that may facilitate the accreditation process. For example, glossary of terms, model design standards, V&V standards, etc.

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KEY DRIVER
VERIFICATION and VALIDATION
(Note: Complete a separate form for each key driver.
Copy this page to the end of this template as needed.)

The data examination must consider both correctness of the data and its interpretation/ translation into M&S parameters.

Date V&V completed: _____
Responsible author: _____
Author's organization: _____

Key Driver (Data Source or Guidance) Identification

Key Driver name: _____
Version or release: _____
Originating organization: _____
Point of contact: _____

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Basis for Confidence in the Data Source or other Document

Briefly describe the Key Driver (data source or document) and how it is used in the model.

Who owns and maintains this source? What drives their review and update schedule?

Model name: _____

Explain why the data source or guidance/instruction document is believed credible (i.e., What makes the data or the guidance authoritative?). Attach any required documentation.

How is the data collected and then tied to the model? Include any data transformations of units/coordinate systems, etc. for data to be appropriate for use as model input.

What are the known limitations and restrictions in the data source?

Is there an evaluation method to ensure data source or other guidance is accurate and correct? What is the frequency of any evaluations?
In addition to detecting any substantive errors, such evaluations would typically serve to identify, and correct or eliminate, typographical errors and other data corruptions, unusual data items, etc.

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Describe any weaknesses in the data source or document and how they may influence the outcome of the model. What is your plan to implement corrections to improve credibility?

What is your overall conclusion as to the suitability of data set or report for use with this model?

STANDARD PROCEDURES FOR ROUTING MODEL ACCREDITATION PACKAGES

1. Accreditation Team

a. Accreditation team lead is the OPNAV N81 action officer (AO).

b. Primary accreditation team members include AOs from OPNAV N80 and N82/FMB.

c. As appropriate, input from model managers and resource sponsors will be incorporated in the accreditation package.

d. The accreditation package will be developed based on the model's V&V Report, model demonstration(s), and any other information source applicable to the model.

e. All OPNAV N8 AOs will receive necessary data (e.g., V&V Report, demonstration, user's guide, configuration management plan, etc) for providing an accreditation level recommendation.

2. Draft Accreditation Package. A draft accreditation package will be routed through model's OPNAV N8 action officers for their review.

a. Draft Accreditation Package contents:

(1) The final V&V Report,

(2) A draft action memo from OPNAV N81 to OPNAV N8B, and

(3) A draft accreditation letter from OPNAV N8B to the resource sponsor.

b. Two weeks should be allocated for reviewing the draft accreditation package. This package should be a culmination of prior V&V Report scrutiny by all AOs and, as such, should not contain surprises to any of the accreditation team members.

c. AO review should focus on ensuring their concurrence with wording and using the time to inform their divisional chain of command.

d. Recognizing that delays are possible, these will be coordinated at the AO-level. Nonetheless, delays of more than four weeks with a given AO are to be discussed with performance/pricing model coordinator in N81.

3. Final Accreditation Package. After OPNAV N80 & OPNAV N82/FMB AOs review, the OPNAV N81 AO will route the accreditation package to OPNAV N8B via the OPNAV performance/pricing model accreditation organization structure.

a. This package will include:

(1) The final V&V Report,

(2) An action memo from OPNAV N81 to OPNAV N8B, and

(3) A draft accreditation letter from N8B to the resource sponsor. The latter will also be provided in electronic format with the package.

b. As applicable, OPNAV N81, OPNAV N80, OPNAV N82/FMB, and the model manager and/or claimant will be copied on the accreditation letter.

c. The final accreditation package routing should include OPNAV:

- N81 AO
- N814B
- N81B
- N81
- N8B

d. The OPNAV N81 approved package will then be forwarded to OPNAV N8B, using the OPNAV Tasker system to track the routing of the package.

e. Routing and review of the recommendation contained in the package is the responsibility of the N8 Front Office.

f. The model’s OPNAV N81 AO will track the accreditation package after it has been forwarded to OPNAV N8B. This can be accomplished by periodic review of the OPNAV Tasker system

ACCREDITATION LEVELS FOR PERFORMANCE/PRICING MODELS

1. Full Accreditation

a. Meets requirements for “Partial Accreditation”

b. Useful in all phases of the PPBE process

c. Less than 20% of modeled program is level-of-effort

d. Demonstrates ability to trace between Programming and Budgeting phases of PPBE process. Model is useful in shaping Navy PPBE Budget resource allocation decisions. Model results (output) can be compared to actual execution data.

2. Partial Accreditation

a. Useful in all phases of the PPBE process except Budgeting

b. Less than 33% of modeled program is level-of-effort

c. Requires separate action to convert model outputs for use in budget resource allocation decisions, including budget quality format.

d. Must be able to routinely exercise the model’s feedback loop

e. Circumstances resulting in this level of accreditation include: Minor deficiencies in the model’s V&V Report, e.g., or untested feedback loop, inadequate User’s Guide or Configuration Management Plan, minor flaws in the concept or design documentation, incomplete description of the model’s components, and other minor flaws that do not substantively impact the credibility of the model’s output.

f. Other circumstances that might result in this level of accreditation include: Significant deficiencies in the model’s V&V Report, including poorly defined or lack of a feedback loop, poorly defined performance levels, tenuous

linkage to CNO guidance, technical errors in the model's computational aglorithms, or other discrepancies that would seriously undermine the credibility of the model's output.

3. Not Accredited

a. Not useful in either the Programming or Budgeting phases of the PPBE process

b. Circumstances resulting in this level of accreditation include: Insufficient (or poorly defined) performance levels, less than two key drivers, lack of resource sponsor endorsement, failure to link model to CNO guidance, more than 33% of program(s) modeled are LOE, or any other substantive weakness that would seriously undermine the credibility of the model in providing resource allocation decision insight.

ACCREDITATION LEVEL	PLANNING	PROGRAMMING	BUDGETING	EXECUTION
Full Accreditation	Y	Y	Y (Note 2)	Y (Note 3)
Partial Accreditation	Y	Y	N	Y (Note 3)
Not Accredited	Y (Note 1)	N	N	N

Note 1: Use in PLANNING is optional (OPNAV N8 probably will not use the model)
Note 2: Must demonstrate traceability between Budgeting and Programming
Note 3: EXECUTION is integral to providing valid feedback to accredited models

RE-ACCREDITATION PROCEDURES FOR PERFORMANCE/PRICING MODELS

1. Purpose. To discuss requirements and procedures for re-accrediting performance/pricing models.

2. Discussion. Performance models earn accreditation levels based on the ability of the model to provide valid output that is useful to Navy decision makers and budget managers. Re-accreditation provides a formal means of review by OPNAV to insure both continuous improvement of accredited models and to prevent inadequate model processes from influencing the POM/PR development recommendations from budget submitting offices (BSOs) and resource sponsors.

3. Procedures

a. Performance/Pricing Model Stakeholders. Stakeholders are responsible for maintaining a culture of review to ensure that problems or issues with accredited models are detected early and resolved quickly.

b. Follow-Up Accreditation. Model managers are expected to continually strive to improve model accuracy and usefulness. This ongoing process likely will cause incremental and possibly substantive changes to the model over time. Also, circumstances may exist that require follow-up accreditation for a performance model to earn or maintain full accreditation. These circumstances include:

(1) Outstanding Action Items. A model must undergo a follow-up accreditation if the model’s most recent accreditation report included actionable recommendations for enhancements or revisions to the model. Actionable recommendations are those that the accrediting authority has determined essential to meeting full accreditation. For example, an incomplete configuration management plan or an inaccurate pricing methodology will usually result in actionable recommendations.

(2) Not Approved by MPVT. Models that were identified as “non-approved” models in the most recent MPVT briefing series must complete follow-up accreditation before being eligible for full accreditation.

(3) Routine Re-accreditation. All fully accredited models must undergo a routine re-accreditation every three years, unless there have been substantive changes to the model. Such changes are discussed in the "Emergent Re-Accreditation" paragraph below. Routine re-accreditations shall use the most current VV&A guidance and templates and will entail a complete re-evaluation of the applicable model by both the model manager and the N8 Accreditation Team. The three-year ticker begins on date found on the full accreditation letter from OPNAV N8.

(4) Emergent Re-accreditation. A model must undergo an emergent re-accreditation if there have been substantive changes in its design or use at any time prior to its routine re-accreditation (described in paragraph 3.b.(3) above. Examples of such changes include:

(a) Key Driver Changes. If changes to key drivers are expected to result in inaccurate model output for use in programming or budgetary review cycles.

(b) Model Re-Design. The model has been re-designed or enhanced, including replacement by a newer version that requires the user's manual to be re-issued or a new verification and validation to be performed.

(c) Invalid Feedback Results. A results validation or feedback analysis shows that the model is unsatisfactorily inaccurate for use in budgetary and/or review cycles.

(5) Except as cited in paragraph 3.b.(3) above, follow-up accreditations are only required to focus on the changes or actionable recommendations that result in the requirement to be re-accredited – i.e., model managers are only required to revise applicable parts of the V&V Report for follow-on accreditations submitted under this paragraph. Model managers shall use the existing VV&A guidance and templates in developing the applicable follow-up accreditation report.

c. All model managers shall incorporate the requirements outlined above into existing or future plans of actions and milestone (POA&M) documentation.

MODEL PRICING VALIDATION TEAM (MPVT) PROCESS

1. Purpose. To provide MPVT guidance for reviewing key aspects of resource determination for performance-modeled programs and to identify cost/pricing issues early in the POM/PR development process.

2. Background. Performance/Pricing models are expected to facilitate resource decisions. The MPVT process enables a review of cost/pricing issues for various programs and is a necessary step in properly resourcing these programs through the next President's budget submission. The MVPT process supplements the normal POM/PR development and budget formulation. This process identified programs as either "Approved" or "Non-Approved" for budget review purposes. Reference (c) provides guidelines for budget review requirements.

3. MPVT Review Process. The review will emphasize pricing adjustments in the first and second execution years of the POM/PR being developed. However, pricing disparities in POM/PR outyears should also be identified.

a. For each model, the review team will be comprised of the model manager and representatives from OPNAV N8; FMB; Commander, Fleet Forces Command (CFFC); Commander, Pacific Fleet; and representatives of other Secretariat and OPNAV organizations (e.g., N1, N4, etc) as appropriate. Applicable BSOs should also be represented for each model's MPVT briefing. All team members must be familiar with the accredited model and be able to represent their organization in a decision-making capacity.

b. FMB representatives are responsible for ensuring that the cost/pricing factors used in this program/budget cycle are correct and defendable at higher levels of review, using MVPT results and other required exhibits (including OP-5's, OP-30, etc.) that generate budget justification data.

c. OPNAV N81 staff is responsible for verifying that any proposed changes to cost/pricing methodology for determining resource requirements are consistent with - or incorporated in - the accredited version of the model.

d. OPNAV N80 staff is responsible for assessing the effect of each Navy program's cost/pricing factors throughout the Future Years Defense Program (FYDP).

e. Resource Sponsor and Fleet staffs are responsible for ensuring that the cost/pricing methodology is relevant to the model's performance output in terms of the readiness or service-level requirements, resulting in the assurance that key performance metrics are being used to manage and justify resources requests.

4. Programs Included in MPVT Process. All accredited models will participate in the MPVT briefing series. Each model manager's presentation should identify the pricing factors to be used in the POM/PR programming/budget development cycle, including the key model parameters that drive resource requirements and their values. The desired outcome of each MPVT brief and review is a resource request that remains valid, flexible and defendable through the budget cycle. Additionally, the MPVT review should establish an agreed upon cost/pricing baseline for assessing risk or readiness outcomes identified in future CNO program proposals. The MPVT will provide a cost/pricing review among stakeholders involved in the process.

Note: Non-accredited models will not participate in the annual MPVT briefing series. Instead, pricing validation shall be conducted as part of the initial accreditation process.

Model managers shall ensure the following elements are included in their MPVT brief:

a. Progress of model development for the program, to include the status of reaching any existing validation date;

b. Validation of significant changes to baseline costs from those used in prior year's POM/PR;

c. Pricing factors used in the model for POM/PR program/budget development cycle;

d. An assessment of the model's ability to respond to risk or readiness outcomes in proposals for the budget years - e.g., POM-08 includes FY08 and FY09; PR-09 includes FY09 - of the POM/PR being developed;

e. Quantify specific categories of funding (e.g., Budget Line Item (BLI), Program Element (PE), Special Interest sub-PE, etc.) identified within the model; and

f. Process by which model outputs are transformed into budget quality format described in reference (c).

5. MPVT Review Planning. Model managers should limit their presentation to 30 minutes, followed by 25 minutes for discussion. The review schedule and template for MPVT briefings will be published annually by N8 serial no later than December. The desired briefing format is Power Point, with Excel spreadsheets for back-up data. For all briefs, electronic read-ahead copies should be emailed to team members at least 48 hours prior to the scheduled briefing time.

PERFORMANCE/PRICING MODEL PROCESS RESPONSIBILITIES

1. OPNAV N8

a. Develop and promulgate guidance to ensure Navy resources and requirements are modeled to the utmost practicable extent. (N8)

b. Review and approve/disapprove exemption requests, as required(N8).

c. As necessary, provide an annual serial that summarizes projected VV&A requirements, points of contact, accreditation team membership, and any revisions to previously issued guidance or templates (N8).

d. Establish model accreditation teams comprised of representatives from OPNAV N80, N81, N82, and other subject matter experts as necessary (N8).

e. Assign action officer(s) to support each model's development, accreditation, re-accreditation, and use in the PPBE process. This individual is responsible for providing feedback to model managers as part of the OPNAV N8 model accreditation team (N80, N81, N82).

f. Serve as the lead branch in OPNAV for model accreditation (N81).

g. Make formal recommendations to N8 for model accreditation level. Enclosure (5) will be used for developing and routing this recommendation (N81).

h. Maintain control of master versions of accredited models (N80).

i. Monitor the accreditation and re-accreditation status of all OPNAV models (N81).

j. Monitor models for substantive changes, as addressed in enclosure (7), which would require emergent re-accreditation (N80, N81, N82).

k. Ensure that models make valid pricing and pricing methodology assumptions in developing outputs (N82).

l. Plan, coordinate, execute, and report the annual MPVT briefings (N80, N81, N82).

2. Resource Sponsors

a. Encourage the development and use of models to make resource allocation decisions throughout the PPBE process. Participate in the model development and V&V process.

b. Ensure that models are credible and provide quantitatively defendable resource allocation trade space.

c. Identify and discuss the use of models in POM/PR development briefings.

d. During POM/PR development briefings, specifically discuss programs with annual requirements over $50M that do not use an OPNAV N8-accredited model to determine resource requirements.

e. Approve and monitor plans to improve models.

f. Monitor models for substantive changes, as addressed in enclosure (7), which would require emergent re-accreditation.

g. Ensure that all models used in making resource allocation decisions are registered in MSRR and use standard Navy software.

3. Budget Submitting Offices/Principal Administering Offices

a. Working with applicable resource sponsor(s), identify and describe programs for which models are to be developed. This should be documented using the template found in enclosure (4).

b. Identify a lead point of contact for each model within the claimancy to coordinate model development and accreditation with OPNAV N8 accreditation team members.

4. Model Managers

a. Develop and maintain model(s) for which they have cognizance. Enclosure (3), or a more current revision, should be used to this end.

b. Develop models using standard Navy software, as practicable. Models must be registered with applicable FAMs in order to support DoN's goal of minimizing the number of IT systems in the department.

c. Ensure that V&V Reports are submitted as scheduled and that anticipated delays are promptly coordinated with OPNAV N81.

d. Prepare briefings and model demonstrations as needed to enable OPNAV N8 to conduct a thorough model accreditation or re-accreditation.

e. Prevent changes to an accredited model, except through the formal process contained in the model's Configuration Management Plan.

f. Ensure that OPNAV N81 is advised of any change in contact information.

g. Develop, submit, and execute plans to improve accredited models.

h. Monitor models for substantive changes, as addressed in enclosure (7), which would require emergent re-accreditation.

i. Provide annual briefings in support of the MPVT process.

j. No less than annually, demonstrate the accuracy of the model by comparing the model's predicted resource requirements with corresponding execution data. This may coincide with the MPVT briefing process, but should be conducted no later than completion of the MPVT briefings.